

### **ABSTRACT OF THE DISCLOSURE**

An apparatus and method for producing fatty acid alkyl esters from fatty acids derived from vegetable oils and animal fats with an alkaline solution dissolved in stoichiometric or near-stoichiometric levels of a monoalkyl alcohol to form a mixture. The method further comprises emulsifying the mixture as a means to reach a completed chemical reaction state in a reactor section, wherein the oils or fats are transesterified into fatty acid alkyl esters. The transesterification occurs when the natural boundary surfaces of the immiscible mixture are enlarged by ultrasonic cavitation in the reaction section and the transesterification is performed at, or near atmospheric pressure. The method finally includes, after reaching the chemical reaction state, separating residues from the fatty acid alkyl ester in a gravitational phase separation section.